

General Disclaimer

One or more of the Following Statements may affect this Document

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.
- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.
- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.
- This document is paginated as submitted by the original source.
- Portions of this document are not fully legible due to the historical nature of some of the material. However, it is the best reproduction available from the original submission.

DEPARTMENT OF THE NAVY
NAVAL AMMUNITION DEPOT
CRANE, INDIANA 47522

IN REPLY REFER TO:

QEW-LAG:bc
8900

10 DEC 1969

From: Commanding Officer, Naval Ammunition Depot, Crane, Indiana
To: National Aeronautics and Space Administration, Goddard Space Flight Center (Code 716.2, Mr. T. J. Hennigan), Greenbelt, Maryland 20771
Subj: Monthly Progress Report on National Aeronautics and Space Administration Space Cell Test Program (4 copies)
Ref: (a) NASA Purchase Order W12-397 of 19 January 1967 to NAD Crane
Encl: (1) Explanation of Data
(2) Information on Active Tests as of 31 October 1969
(3) Information on Completed Tests as of 31 October 1969
(4) Data Available

1. The monthly status report of the Spacecraft Cell Testing program being done at NAD Crane for the National Aeronautics and Space Administration, under the direction of Goddard Space Flight Center, is submitted in accordance with reference (a). This status report lists the types of cells on test and their test parameters; and includes those cells which have completed tests.

2. Enclosure (1) is an explanation of the symbolic names used for the information on each pack listed in enclosures (2) and (3).

3. Enclosure (2) contains information on current tests; and enclosure (3) contains that on cells which have completed tests.

4. Data available in the form of printed lines, punched cards, or magnetic tape is listed in enclosure (4).

C. G. LYNCH
By direction

N70-12462	
(ACCESSION NUMBER)	(THRU)
33	1
(PAGES)	(CODE)
CV #107116	03
(NASA CR OR TMX OR AD NUMBER)	(CATEGORY)



Copy to:

NASA (Mr. Ernst M. Cohn, RHW), Washington, D. C. 20546
NASA, Scientific and Technical Information Division (Winnie M. Morgan, SU),
Washington, D. C. 20546
NASA, Goddard Space Flight Center (Code 716.5, Mr. Charles MacKenzie),
Greenbelt, Maryland 20771
NASA, Lewis Research Center (M.S. 309-1, Mr. B. Nagle), 21000 Brookpark
Road, Cleveland, Ohio 44135
Douglas Missile and Space Systems Div., Astropower Lab., (Mr. Albert Hiny,
Section Chief), 2121 Campus Drive, Newport Beach, California 92663
General Electric Company (Mr. Guy Rampell), Gainesville, Florida 32601
General Electric, Spacecraft Department (Mr. M. Read, Room M-2614),
P. O. Box 3555, Philadelphia, Pennsylvania 19101
Gulton Industries, Inc. (Mr. Carl Preusse), Metuchen, New Jersey 08840
Lockheed Missiles and Space Company (Mr. R. E. Corbett, Dept. 62-23,
Bldg. 154), P. O. Box 504, Sunnyvale, California 94088
TRW Systems, Inc. (Dr. W. R. Scott), Redondo Beach, California 90278

EXPLANATION OF DATA

1. An explanation of the symbolic names used on line one of enclosures (2) and (3) follows:

a. TYPE: This stands for the type of cells in the pack. The following is a list of the symbols for the various types of cells.

(1) AGCD: Silver-Cadmium Cells.

(2) AGZII: Silver-Zinc Cells.

(3) NICD: Nickel-Cadmium Cells.

(4) PBCA: Lead-Calcium Cells.

(5) PBH+: Lead-Acid Cells.

b. AMPHR: This stands for the ampere-hour capacity of the individual cells as rated by the manufacturer. Cells tested in this program have ranged in rated capacity from 1.25 to 50 ampere-hours.

c. PEROD: This is the total time (in hours) for one charge-discharge period during automatic cycling. The various cycle periods are listed below with the corresponding charge and discharge times.

<u>Cycle Period</u>	<u>Charge Time</u>	<u>Discharge Time</u>
1.5 hr.	1.0 hr.	0.5 hr.
3.0 hr.	2.5 hr.	0.5 hr.
8.0 hr.	7.0 hr.	1.0 hr.
24.0 hr.	23.0 hr.	1.0 hr.

d. DEPTH: This is the depth of discharge. The depth of discharge is given as a percentage of the manufacturer's rated ampere-hour capacity to be removed during discharge. The depths of discharge at which cells are presently being cycled range from 10 to 75 percent.

e. TEMP: This is the ambient temperature at which the cells undergo automatic cycling. The various ambient temperatures at which cells are currently cycling are -20°, 0°, 20°, 25° and 40° C.

f. MANFR: This stands for the manufacturer of the cells. The manufacturer is represented by one of the following symbols:

(1) CD: C&D Batteries.

(2) DL: Delco-Remy.

- (3) ESB: ESB, Incorporated.
- (4) GE: General Electric.
- (5) GO: Gould-National Batteries, Inc.
- (6) GU: Gulton Industries, Inc.
- (7) MD: McDonnell Douglas (Astropower).
- (8) NF: NIFE, Jungner of Sweden.
- (9) SO: Sonotone Corporation.
- (10) YD: Yardney Electric Corporation.

g. SPSYM: This stands for special symbol. These symbols are used to describe special types of cells. They also indicate new charge control methods and devices used during automatic cycling.

- (1) AE: Auxiliary electrode cells.
- (2) AE-GE: General Electric type.
- (3) AE-GU: Gulton type.
- (4) AE-RE: Auxiliary electrode and recombination electrode.
- (5) AE13: General Electric type AB13.
- (6) AE14: General Electric type AB14.
- (7) CC: Commercial cells.
- (8) CHSP: "Chemsorb" separator.
- (9) CLM: Coulometer in series with cells to effect charge control.
- (10) CPSP: Cellophane separator.
- (11) C3SP: C3 separator.
- (12) FRS: Folded seal, same type of seal as RS below.
- (13) HSAD: Hermetically sealed adhydrode.
- (14) IM: Cells with improved material and methods used in construction.
- (15) IPD: Cells containing an internal pressure device.

- (16) NB: NIMBUS cells.
- (17) NBPT: NIMBUS cells with pressure transducers.
- (18) PLSP: Pellon separator.
- (19) PS: Polymerized neoprene terminal to cover seal.
- (20) PT: Pressure transducer.
- (21) RCPSP: Radiated cellophane separator.
- (22) RS: Vulcanized neoprene terminal to cover seal.
- (23) ST: Stabistors used for charge control of cells.
- (24) WNSP: Woven nylon separator.
- (25) 2SR: Two-step regulator used for charge control of cells.
- (26) 3S: Triple seal between terminals and cover (ceramic between glass).

h. PACK: This stands for pack identification number. The numeric part of the number was assigned arbitrarily and is for convenient identification of the pack. The alphabetic character indicates the chronological order in which the packs were run. That is, pack 1A completed automatic cycling prior to starting pack 1B.

i. PRCHG: This represents the percent recharge. It is the charge following discharge, and is given as a percentage of the ampere-hours removed on the previous discharge. The percent recharge will range from 100 to 200 percent.

j. CHGCU: This represents the specified charging current in amperes.

k. DISCU: This represents the specified discharging current in amperes.

l. VOLIM: This is the specified per cell on charge voltage limit. Cells on test are connected in electrical series. The average cell voltage must not exceed this value during charging. The value is given in volts. Not all batteries on test have a per cell voltage limit. However, for those that do, the voltage limits will range from 1.45 to 1.60 volts per cell for nickel-cadmium cells; and from 1.97 to 2.05 volts per cell for silver-zinc cells.

m. NUMCP: This is the total number of cells connected in electrical series initially to form the pack.

n. STARTED: This is the date the pack was put on automatic cycling.

o. CYCLES: This is the number of charge-discharge cycles completed as of the end of the month by the active packs listed in enclosure (2). On the inactive packs, enclosure (3), this is the total number of charge-discharge cycles completed at the time the pack was removed from automatic cycling.

p. CELLS: This is the total number of cells still on automatic cycling at the end of the month.

q. FAILURES: This gives the total number of cells failed during the month.

r. COMPLETED: This is the date the pack was removed from automatic cycling.

INFORMATION ACTIVE TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP
------	-------	-------	-------	------	-------	-------	------	-------	-------	-------	-------	-------

AGCD	11.00	24.0	18	00	YD	AE-GU	057D		0.25	2.00	1.51	5
AGCD	8.00	8.0	25	25	ESB	AE	001B 175		0.50	2.00	1.51	5
AGCD	5.00	24.0	20	00	YD	NONE	113B NONE		0.30	1.00	1.50	5
NICD	20.00	3.0	40	25	SO	IPD	046A		20.00	16.00	1.50	10
NICD	20.00	1.5	25	25	SO	IPD	010A 140		7.00	10.00	1.49	10
NICD	20.00	1.5	25	25	SO	IPD	022A		20.00	10.00	1.50	10
NICD	20.00	1.5	15	25	GU	AE	019B		8.00	6.00		5
NICD	20.00	1.5	15	00	GU	AE	054B		8.00	6.00		5
NICD	20.00	1.5	25	0/4	GU	MULTI	048C		10.00	10.00		6
NICD	12.00	3.0	25	00	GE	NONE	125A 115		1.38	6.00	1.55	5
NICD	12.00	3.0	15	00	GE	NONE	111A 115		0.83	3.60	1.55	5
NICD	12.00	1.5	40	00	GU	AE	071B NONE		6.00	9.60	NONE	5
NICD	12.00	1.5	25	00	GU	AE	070A NONE		6.00	6.00	NONE	5
NICD	12.00	1.5	25	00	GU	NONE	101B 115		3.45	6.00	1.55	5 1
NICD	12.00	1.5	25	00	GE	NONE	124A 115		3.45	6.00	1.55	5
NICD	12.00	1.5	15	00	GU	NONE	016B 115		2.07	3.60	1.55	5
NICD	12.00	1.5	15	00	GE	NONE	110A 115		2.07	3.60	1.55	5
NICD	6.00	1.5	25	25	GE	AE	005B		3.00	3.00		5
NICD	6.00	1.5	25	40	GE	AE	006C		3.00	3.00		5
NICD	6.00	1.5	25	40	GE	AE	042C		3.00	3.00		5
NICD	6.00	3.0	25	40	GU	CLM	029B NONE		3.00	3.00	NONE	5 1
NICD	6.00	1.5		20	GU		051B		0.30	0.10		10
NICD	6.00	1.5	25	25	GE	AE	017B		3.00	3.00		5
NICD	6.00	3.0	25	25	GU	CLM	018C NONE		3.00	3.00	NONE	5 1
NICD	6.00	1.5	15	25	GE	AE	028C		1.80	1.80		5
NICD	6.00	3.0	25	-20	GU	CLM	041B NONE		3.00	3.00	NONE	5 1

INFORMATION ACTIVE TESTS

ANFR SPSYM PACK PRCHG CHGCU DISCU VOLIM NUMCP STARTED CYCLES CELLS FAILURES

YD	AE-GU	057D		0.25	2.00	1.51	5	2-14-68	610	4	0
ESB	AE	001B	175	0.50	2.00	1.51	5	9- 9-66	3291	4	0
YD	NONE	113B	NONE	0.30	1.00	1.50	5	1-22-67	1010	5	0
SO	IPD	046A		20.00	16.00	1.50	10	9-20-67	5751 3501	2	0
SO	IPD	010A	140	7.00	10.00	1.49	10	9-20-67	7691 7189	10	0
SO	IPD	022A		20.00	10.00	1.50	10	9-20-67	7167 6664	1	0
GU	AE	019B		8.00	6.00		5	3-23-68	9361	5	0
GU	AE	054B		8.00	6.00		5	3-23-68	9350	5	0
GU	MULTI	048C		10.00	10.00		6	5-26-69	1704	6	0
GE	NONE	125A	115	1.38	6.00	1.55	5	1- 4-64	16267	5	0
GE	NONE	111A	115	0.83	3.60	1.55	5	1- 4-64	15971	5	0
GU	AE	071B	NONE	6.00	9.60	NONE	5	1- 6-67	15712	4	0
GU	AE	070A	NONE	6.00	6.00	NONE	5	2-10-67	15447	5	0
GU	NONE	101B	115	3.45	6.00	1.55	5	12-19-64	27268	4	0
GE	NONE	124A	115	3.45	6.00	1.55	5	1- 4-64	32067	3	0
GU	NONE	016B	115	2.07	3.60	1.55	5	2-20-65	26375	5	0
GE	NONE	110A	115	2.07	3.60	1.55	5	1- 4-64	31493	5	0
GE	AE	005B		3.00	3.00		5	5-20-68	7556	5	0
GE	AE	006C		3.00	3.00		5	6- 6-68	8151	5	0
GE	AE	042C		3.00	3.00		5	5-20-68	8407	5	0
GU	CLM	029B	NONE	3.00	3.00	NONE	5	11-18-66	6512 7841	5	0
GU		051B		0.30	0.10		10	2-27-69	3898	10	0
GE	AE	017B		3.00	3.00		5	5-20-68	8440	5	0
GU	CLM	018C	NONE	3.00	3.00	NONE	5	11-18-66	7975	4	0
GE	AE	028C		1.80	1.80		5	7-18-68	7525	4	0
GU	CLM	041B	NONE	3.00	3.00	NONE	5	11-18-66	7990	4	0

Enclosure (2)

FOLDOUT FRAME

INFORMATION ACTIVE TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STA
NICD	6.00	3.0	25	00	GU	CLM	066B	NONE	3.00	3.00	NONE	5	11-1
NICD	6.00	1.5	25	*	GU	AE	024C	NA	3.00	3.00	NONE	5	4-2
NICD	6.00	1.5	25	*	GU	HSAD	058D		3.00	3.00		5	1-1
NICD	6.00	1.5	25	00	GU	IM	013B	115	1.73	3.00	1.55	5	2-2
NICD	6.00	1.5	25	00	GE	AE	052C		3.00	3.00		5	6-
NICD	6.00	1.5	25	00	GE	AE	050B		3.00	3.00		5	3-2
NICD	6.00	1.5	15	00	GE	AE	053B		1.80	1.80		5	7-1
NICD	6.00	1.5	15	*	GU	AE	060B	NA	1.80	1.80	NONE	5	4-2
NICD	6.00	1.5	15	*	GU	HSAD	036D		1.80	1.80		5	1-1
NICD	6.00	1.5	10	00	GU	NONE	061B	110	0.66	1.20	1.55	10	6-
NICD	6.00	1.5	25	*	GE	AE	062B		3.00	3.00		5	7-
NICD	6.00	1.5	25	*	GE	AE	065B		3.00	3.00		5	7-
NICD	5.60	1.5	25	-20	GU	FRS	044B	115	1.61	2.80	1.60	5	1-
NICD	5.60	1.5	25	-20	GU	RS	032B	115	1.61	2.80	1.60	5	1-
NICD	5.60	1.5	25	00	GU	RS	090C	115	1.61	2.80	1.55	5	12-27
NICD	5.60	1.5	25	00	GU	FRS	100B	115	1.61	2.80	1.55	5	12-17
NICD	5.00	1.5	25	00	GE	NBPT	107A	110	1.38	2.50	1.49	5	6-
NICD	5.00	1.5	15	25	GE	NB	106A	120	0.90	1.50	1.49	5	4-2
NICD	5.00	1.5	15	25	GU	NB	120A	120	0.90	1.50	1.49	5	5-
NICD	5.00	1.5	15	00	GE	NB	103A	110	0.83	1.50	1.49	5	4-2
NICD	5.00	1.5	15	00	GU	NB	117A	110	0.83	1.50	1.49	5	5-
NICD	4.00	1.5	25	25	GU	CC	004B	125	1.25	2.00	1.49	5	8-
NICD	4.00	1.5	25	00	GU	CC	126B	115	1.15	2.00	1.55	5	7-25
NICD	4.00	1.5	15	00	GU	CC	115B	115	0.69	1.20	1.55	5	7-25
NICD	3.90	1.5	25	00	NIFE	NONE	097C	107	1.07	2.00	1.50	5	9-29
NICD	3.50	1.5	40	-20	GU	PS	075D	110	1.54	2.80	1.56	5	12-24

FOLDOUT FRAME

FOLDOUT

INFORMATION ACTIVE TESTS

MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	CYCLES	CELLS	FAILURES
GU	CLM	066B	NONE	3.00	3.00	NONE	5	11-18-66	8391	5	0
GU	AE	024C	NA	3.00	3.00	NONE	5	4-25-67	14610	5	0
GU	HSAD	058D		3.00	3.00		5	1-11-69	4731	5	0
GU	IM	013B	115	1.73	3.00	1.55	5	2-22-65	26514	4	0
GE	AE	052C		3.00	3.00		5	6- 6-68	8142	5	0
GE	AE	050B		3.00	3.00		5	5-20-68	8417	5	0
GE	AE	053B		1.80	1.80		5	7-19-68	7437	4	0
GU	AE	060B	NA	1.80	1.80	NONE	5	4-25-67	14629	5	0
GU	HSAD	036D		1.80	1.80		5	1-11-69	4734	5	0
GU	NONE	061B	110	0.66	1.20	1.55	10	6- 7-67	13574	10	0
GE	AE	062B		3.00	3.00		5	7- 4-68	2316	5	0
GE	AE	065B		3.00	3.00		5	7- 4-68	7627	5	0
GU	FRS	044B	115	1.61	2.80	1.60	5	1- 2-66	21509	4	0
GU	RS	032B	115	1.61	2.80	1.60	5	1- 2-66	21397	3	0
GU	RS	090C	115	1.61	2.80	1.55	5	12-27-65	21839	4	0
GU	FRS	100B	115	1.61	2.80	1.55	5	12-17-65	21726	5	0
GE	NBPT	107A	110	1.38	2.50	1.49	5	6- 5-65	24839	5	0
GE	NB	106A	120	0.90	1.50	1.49	5	4-24-65	25398	4	0
GU	NB	120A	120	0.90	1.50	1.49	5	5- 2-65	24073	4	0
GE	NB	103A	110	0.83	1.50	1.49	5	4-24-65	25468	5	0
GU	NB	117A	110	0.83	1.50	1.49	5	5- 8-65	25038	5	0
GU	CC	004B	125	1.25	2.00	1.49	5	8- 4-64	29752	4	0
GU	CC	126B	115	1.15	2.00	1.55	5	7-25-64	29765	5	0
GU	CC	115B	115	0.69	1.20	1.55	5	7-25-64	29286	5	0
NIFE	NONE	097C	107	1.07	2.00	1.50	5	9-29-67	11917	5	0
GU	PS	075D	110	1.54	2.80	1.56	5	12-24-66	14197 14497	4	0

FOLDOUT FRAME

INFORMATION ACTIVE TESTS

TYPE	AKPHR	PEROD	DEPTH	TEMP	MANFR	SPSYN	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	ST
NICD	3.50	1.5	40	00	GU	PS	099C 115		1.61	2.80	1.55	5	12-
NICD	3.50	1.5	25	25	GU	PS	087C 125		1.09	1.75	1.49	5	12-
NICD	3.50	1.5	25	-20	GU	PS	089C 110		0.96	1.75	1.56	5	12-
NICD	3.50	1.5	25	00	GU	PS	122C 115		1.01	1.75	1.55	5	12-
NICD	3.50	1.5	10	00	SO	NONE	015B 110		0.39	0.70	1.55	10	6-
NICD	3.00	1.5	25	00	SO	3S	031B 115		0.96	1.50	1.55	5	6-
NICD	3.00	1.5	15	00	SO	3S	043B 115		0.52	0.90	1.55	5	6-
NICD	1.25	1.5	60	-20	GU	NONE	088D NONE		1.00	0.63	NONE	5	3-
NICD	1.25	1.5	25	-20	GU	NONE	074B NONE		1.00	0.63	NONE	5	3-
NICD	1.25	1.5	25	00	GU	NONE	108B NONE		1.25	0.63	NONE	5	3-

11

11

FOOTNOTE

- * THESE CELLS ARE IN AMBIENT TEMPERATURE, WHICH VARIES SINUSOIDALLY FROM ZERO TO FORTY DEGREES CENTIGRADE WITHIN A PERIOD OF 48 HOURS.
- * PACKS 15B AND 61B HAVE RECEIVED 22,900 CYCLES AT 10 PERCENT OF DISCHARGE, AND AT -10 DEGREES CENTIGRADE BEFORE CYCLE ONE STARTED AT N.A.D. CRANE

MULTI THESE PACKS CONTAIN TWO CELLS WITH THIRD ELECTRODES, A COULOMB COUNTER, PRESSURE TRANSDUCERS, AND PRESSURE GAGES

FOOTNOTE

- * THESE CELLS ARE IN AMBIENT TEMPERATURE, WHICH VARIES SINUSOIDALLY FROM ZERO TO FORTY DEGREES CENTIGRADE WITHIN A PERIOD OF 48 HOURS.
- * PACKS 158 AND 618 HAVE RECEIVED 22,900 CYCLES AT 10 PERCENT DEPTH OF DISCHARGE, AND AT -10 DEGREES CENTIGRADE BEFORE CYCLE ONE WAS STARTED AT N.A.D. CRANE

MULTI THESE PACKS CONTAIN TWO CELLS WITH THIRD ELECTRODES, A COULOMETER PRESSURE TRANSDUCERS, AND PRESSURE GAGES

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTE
AGCD	12.00	24.0	50	40	YD	NONE	033A	NONE	0.60	6.00	1.50	10	2-14-6
AGCD	12.00	24.0	43	40	YD	AE-GE	009F	NA	0.50	5.20	1.51	5	6-16-6
AGCD	12.00	24.0	50	00	YD	NONE	057A	NONE	0.60	6.00	1.50	10	2-14-6
AGCD	12.00	24.0	43	00	YD	AE-GE	021D	NA	0.50	5.20	1.51	5	6-16-6
AGCD	12.00	1.5	25	25	YD	NONE	082B	130	3.90	6.00	1.55	5	1-17-6
AGCD	12.00	1.5	25	-20	YD	NONE	085B	130	3.90	6.00	1.60	5	1-19-6
AGCD	12.00	1.5	25	00	YD	NONE	097B	130	3.90	6.00	1.58	5	1-19-6
AGCD	11.00	24.0	40	25	YD	NONE	021B	157	0.30	4.40	1.51	10	11- 5-6
AGCD	11.00	24.0	18	25	YD	AE-GU	069B		0.25	2.00	1.51	5	2-14-6
AGCD	11.00	24.0	40	00	YD	NONE	045B	157	0.30	4.40	1.51	10	11- 5-6
AGCD	11.00	8.0	27	25	YD	PLSP	021C	117	0.50	3.00	1.51	5	3-28-6
AGCD	11.00	8.0	27	25	YD	WNSP	045C	117	0.50	3.00	1.51	5	3-28-6
AGCD	11.00	24.0	18	40	YD	AE-GU	033C		0.25	2.00	1.51	5	2-14-6
AGCD	10.00	8.0	30	25	YD	NONE	045D	117	0.50	3.00	1.51	5	5- 3-6
AGCD	5.00	24.0	20	40	YD	C3SP	045A	NONE	0.30	1.00	1.50	5	9-27-65
AGCD	5.00	24.0	20	40	YD	NONE	128B	NONE	0.30	1.00	1.50	5	1-19-6
AGCD	5.00	24.0	20	25	YD	RCPSP	009C	NONE	1.00	10.00	1.97	10	10-27-65
AGCD	5.00	24.0	20	25	YD	C3SP	021A	NONE	0.30	1.00	1.50	5	9-17-65
AGCD	5.00	24.0	20	25	YD	CPSP	033B	NONE	0.30	1.00	1.49	5	10-17-65
AGCD	5.00	24.0	20	25	YD	PLSP	069A	NONE	0.30	1.00	1.50	5	10-27-65
AGCD	5.00	24.0	20	25	YD	NONE	105B	NONE	0.30	1.00	1.50	5	1-12-67
AGCD	5.00	24.0	20	25	YD	NONE	077B	NONE	0.30	1.00	1.50	5	1-12-67
AGCD	5.00	8.0	20	25	YD	NONE	118C	NONE	0.30	1.00	1.50	5	1-17-67
AGCD	5.00	24.0	20	00	YD	C3SP	057B	NONE	0.30	1.00	1.50	5	9-17-65
AGCD	5.00	8.0	20	00	YD	NONE	114B	NONE	0.30	1.00	1.50	5	1-22-68
AGCD	3.00	1.5	16	25	YD	NONE	002C	260	1.30	1.00	1.52	9	9-16-66

FOLDOUT FRAME

FOLDOUT FR

INFORMATION ON COMPLETED TESTS

TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
40	YD	NONE	033A	NONE	0.60	6.00	1.50	10	2-14-64	9-20-64	210
40	YD	AE-GE	009F	NA	0.50	5.20	1.51	5	6-16-67	5-28-68	310
00	YD	NONE	057A	NONE	0.60	6.00	1.50	10	2-14-64	9- 3-64	168
00	YD	AE-GE	021D	NA	0.50	5.20	1.51	5	6-16-67	8-14-67	61
25	YD	NONE	082B	130	3.90	6.00	1.55	5	1-17-66	11-27-66	4559
-20	YD	NONE	085B	130	3.90	6.00	1.60	5	1-19-66	3-25-67	2375
00	YD	NONE	097B	130	3.90	6.00	1.58	5	1-19-66	3-15-67	4481
25	YD	NONE	021B	157	0.30	4.40	1.51	10	11- 5-66	1-13-67	69
25	YD	AE-GU	069B		0.25	2.00	1.51	5	2-14-68	7-10-69	507
00	YD	NONE	045B	157	0.30	4.40	1.51	10	11- 5-66	3-13-67	121
25	YD	PLSP	021C	117	0.50	3.00	1.51	5	3-28-67	4- 9-67	37
25	YD	WNSP	045C	117	0.50	3.00	1.51	5	3-28-67	4-22-67	70
40	YD	AE-GU	033C		0.25	2.00	1.51	5	2-14-68	5-15-69	447
25	YD	NONE	045D	117	0.50	3.00	1.51	5	5- 3-67	11-21-68	1759
40	YD	C3SP	045A	NONE	0.30	1.00	1.50	5	9-27-65	11-16-65	61
40	YD	NONE	128B	NONE	0.30	1.00	1.50	5	1-19-67	11- 4-67	269
25	YD	RCPSP	009C	NONE	1.00	10.00	1.97	10	10-27-65	12- 1-65	34
25	YD	C3SP	021A	NONE	0.30	1.00	1.50	5	9-17-65	12-25-65	98
25	YD	CPSP	033B	NONE	0.30	1.00	1.49	5	10-17-65	11- 4-67	720
25	YD	PLSP	069A	NONE	0.30	1.00	1.50	5	10-27-65	7-17-67	610
25	YD	NONE	105B	NONE	0.30	1.00	1.50	5	1-12-67	4-19-67	77
25	YD	NONE	077B	NONE	0.30	1.00	1.50	5	1-12-67	11-12-68	661
25	YD	NONE	118C	NONE	0.30	1.00	1.50	5	1-17-67	7- 3-68	1505
00	YD	C3SP	057B	NONE	0.30	1.00	1.50	5	9-17-65	6-17-66	267
00	YD	NONE	114B	NONE	0.30	1.00	1.50	5	1-22-68	6-25-68	14966
25	YD	NONE	002C	260	1.30	1.00	1.52	9	9-16-66	12-12-67	7039

FOLDOUT FRAME

Enclosure (3)

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTE
AGZN	40.00	24.0	25	25	DL	NONE	075B	NONE	25.00	10.00	1.97	5	10-28-6
AGZN	25.00	24.0	40	25	DL	2SR	009D	NONE	1.00	10.00	1.97	10	12-13-6
AGZN	25.00	24.0	40	25	DL	2SR	009E	NONE	1.00	10.00	1.97	10	10- 5-6
AGZN	25.00	24.0	40	25	DL	NONE	075A	NONE	15.00	10.00	1.97	5	8-18-6
AGZN	25.00	24.0	40	25	DL	NONE	089A	NONE	15.00	10.00	1.97	5	9-18-6
AGZN	25.00	3.0	40	25	DL	NONE	088B	NONE	15.00	20.00	1.97	5	3- 1-6
AGZN	25.00	3.0	40	25	DL	NAOH	088C	NONE	15.00	20.00	1.97	5	3-26-6
AGZN	16.00	24.0	31	25	YD	NONE	057C	230	0.50	5.00	2.00	10	12- 2-6
AGZN	12.00	24.0	42	25	YD	NONE	009A	NONE	0.50	5.00	1.97	10	5- 7-6
NICD	50.00	1.5	25	40	GU	NONE	081A	NONE	14.33	25.00	1.55	5	7- 5-6
NICD	50.00	1.5	25	40	GU	NONE	109A	160	14.33	25.00	1.55	5	7-11-6
NICD	50.00	1.5	25	00	GU	NONE	095A	115	14.38	25.00	1.55	5	6- 8-6
NICD	50.00	1.5	15	40	GU	NONE	123A	160	12.00	15.00	1.45	5	6- 8-6
NICD	20.00	1.5	75	25	SO	IPD	072B		20.00	30.00	1.50	10	9-20-6
NICD	20.00	1.5	40	25	SO	IPD	034B		20.00	16.00	1.50	10	9-20-6
NICD	20.00	3.0	40	25	GO	NONE	119A	125	4.00	16.00	1.49	5	2- 1-6
NICD	20.00	3.0	40	25	GU	NONE	088A	125	4.00	16.00	1.49	5	2- 1-6
NICD	20.00	3.0	25	40	GO	NONE	122A	160	3.20	10.00	1.45	5	1-24-6
NICD	20.00	3.0	25	40	GU	NONE	091A	160	3.20	10.00	1.45	5	1-24-6
NICD	20.00	3.0	25	25	GO	NONE	105A	125	2.50	10.00	1.49	5	1-21-6
NICD	20.00	1.5	25	*	GU	MULTI	036C		10.00	10.00		5	2- 8-6
NICD	20.00	3.0	25	25	GU	NONE	074A	125	2.50	10.00	1.49	5	1-21-6
NICD	20.00	3.0	25	00	GO	NONE	094A	115	2.30	10.00	1.55	5	1-24-6
NICD	20.00	3.0	25	00	GU	NONE	116A	115	2.30	10.00	1.55	5	2-11-6
NICD	20.00	1.5	15	*	GU	MULTI	012D		10.00	6.00		5	2- 8-6
NICD	20.00	3.0	15	40	GO	NONE	108A	160	1.92	6.00	1.45	5	1-24-6

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
25	DL	NONE	075B	NONE	25.00	10.00	1.97	5	10-28-64	3-15-65	139
25	DL	2SR	009D	NONE	1.00	10.00	1.97	10	12-13-65	4-18-66	121
25	DL	2SR	009E	NONE	1.00	10.00	1.97	10	10- 5-66	1- 4-67	90
25	DL	NONE	075A	NONE	15.00	10.00	1.97	5	8-18-64	9-18-64	32
25	DL	NONE	089A	NONE	15.00	10.00	1.97	5	9-18-64	12- 8-64	80
25	DL	NONE	088B	NONE	15.00	20.00	1.97	5	3- 1-65	3-16-65	120
25	DL	NAOH	088C	NONE	15.00	20.00	1.97	5	3-26-65	5- 6-65	325
25	YD	NONE	057C	230	0.50	5.00	2.00	10	12- 2-66	8-30-67	281
25	YD	NONE	009A	NONE	0.50	5.00	1.97	10	5- 7-65	7- 7-65	58
40	GU	NONE	081A	NONE	14.33	25.00	1.55	5	7- 5-64	7-12-65	4
40	GU	NONE	109A	160	14.33	25.00	1.55	5	7-11-64	7-26-64	165
00	GU	NONE	095A	115	14.38	25.00	1.55	5	6- 8-64	2- 9-65	3227
40	GU	NONE	123A	160	12.00	15.00	1.45	5	6- 8-64	11-11-64	1878
25	SO	IPD	072B		20.00	30.00	1.50	10	9-20-67	4- 5-69	1143
25	SO	IPD	034B		20.00	16.00	1.50	10	9-20-67	7-14-69	5768
25	GO	NONE	119A	125	4.00	16.00	1.49	5	2- 1-64	9-27-64	1793
25	GU	NONE	088A	125	4.00	16.00	1.49	5	2- 1-64	3-21-64	359
40	GO	NONE	122A	160	3.20	10.00	1.45	5	1-24-64	7- 2-64	983
40	GU	NONE	091A	160	3.20	10.00	1.45	5	1-24-64	10-14-65	4480
25	GO	NONE	105A	125	2.50	10.00	1.49	5	1-21-64	3-17-66	5690
*	GU	MULTI	036C		10.00	10.00		5	2- 8-68	8-14-68	966
25	GU	NONE	074A	125	2.50	10.00	1.49	5	1-21-64	9-27-64	1755
00	GO	NONE	094A	115	2.30	10.00	1.55	5	1-24-64	2-13-66	11162
00	GU	NONE	116A	115	2.30	10.00	1.55	5	2-11-64	2-13-68	10971
*	GU	MULTI	012D		10.00	6.00		5	2- 8-68	5-13-69	7262
40	GO	NONE	108A	160	1.92	6.00	1.45	5	1-24-64	8-31-65	4273

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTI
NICD	20.00	3.0	15	00	GU	NONE	080A 115		1.38	6.00	1.55	5	1-24-
NICD	20.00	3.0	15	00	GU	NONE	102A 115		1.38	6.00	1.55	5	1-24-
NICD	20.00	1.5	40	25	GO	NONE	118A 125		10.00	16.00	1.49	5	2- 1-
NICD	20.00	1.5	40	25	GU	NONE	087A 125		10.00	16.00	1.49	5	2- 1-
NICD	20.00	1.5	40	*	GU	MULTI	058C		10.00	16.00		5	2- 8-
NICD	20.00	1.5	25	40	GO	NONE	126A 160		8.00	10.00	1.45	5	1-16-
NICD	20.00	1.5	25	40	GU	NONE	090A 160		8.00	10.00	1.45	5	1-18-
NICD	20.00	1.5	25	25	GU	NONE	073A 125		6.25	10.00	1.49	5	1-16-
NICD	20.00	1.5	25	25	GO	NONE	104A 125		6.25	10.00	1.49	5	1-16-
NICD	20.00	1.5	25	00	GO	NONE	098A 115		5.75	10.00	1.55	5	1-21-
NICD	20.00	1.5	25	00	GU	NONE	115A 115		5.75	10.00	1.55	5	1-16-
NICD	20.00	1.5	15	40	GU	AE	036B NONE		5.00	6.00	NONE	5	3-11-
NICD	20.00	1.5	15	40	GU	AE	038E		8.00	6.00		5	3-23-
NICD	20.00	1.5	15	40	GU	NONE	076A 160		1.92	6.00	1.45	5	1-18-
NICD	20.00	1.5	15	40	GU	NONE	077A 160		1.92	6.00	1.45	5	1-21-
NICD	20.00	1.5	15	40	GO	NONE	112A 160		4.80	6.00	1.45	5	1-16-
NICD	20.00	1.5	15	25	GU	AE	012C NONE		5.00	6.00	NONE	5	3- 9-
NICD	20.00	1.5	15	00	GU	AE	058B NONE		5.00	6.00	NONE	5	4- 8-
NICD	20.00	1.5	15	00	GO	NONE	084A 115		3.45	6.00	1.55	5	1-16-
NICD	20.00	1.5	15	00	GU	NONE	101A 115		3.45	6.00	1.55	5	1-16-
NICD	12.00	24.0	50	25	GE	NONE	093A 115		0.52	6.00	1.45	5	3-28-
NICD	12.00	3.0	40	25	GE	NONE	097A 125		2.40	9.60	1.49	5	1- 4-
NICD	12.00	3.0	25	40	GE	NONE	100A 160		1.92	6.00	1.45	5	1- 4-
NICD	12.00	1.5	25	40	GU	AE	047B NONE		6.00	6.00	NONE	5	1- 5-
NICD	12.00	1.5	40	25	GU	AE	011B NONE		6.00	9.60	NONE	5	10-17-
NICD	12.00	3.0	15	40	GE	NONE	086A 160		1.15	3.60	1.45	5	12-29-

HOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

MP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
0	GO	NONE	080A	115	1.38	6.00	1.55	5	1-24-64	2-13-68	11378
0	GU	NONE	102A	115	1.38	6.00	1.55	5	1-24-64	2-13-68	11212
5	GO	NONE	118A	125	10.00	16.00	1.49	5	2- 1-64	9- 7-64	2937
5	GU	NONE	087A	125	10.00	16.00	1.49	5	2- 1-64	4- 7-64	627
	GU	MULTI	058C		10.00	16.0		5	2- 8-68	3- 2-68	131
0	GO	NONE	126A	160	8.00	10.00	1.45	5	1-16-64	5-23-64	1574
0	GU	NONE	090A	160	8.00	10.00	1.45	5	1-18-64	11-12-64	4045
5	GU	NONE	073A	125	6.25	10.00	1.49	5	1-16-64	6-30-65	7763
5	GO	NONE	104A	125	6.25	10.00	1.49	5	1-16-64	8-20-64	2980
0	GO	NONE	098A	115	5.75	10.00	1.55	5	1-21-64	1-14-66	10641
0	GU	NONE	115A	115	5.75	10.00	1.55	5	1-16-64	6-24-64	2291
0	GU	AE	036B	NONE	5.00	6.00	NONE	5	3-11-67	9- 5-67	2740
0	GU	AE	038E		8.00	6.00		5	3-23-68	1- 6-69	4520
0	GU	NONE	076A	160	1.92	6.00	1.45	5	1-12-64	10-15-65	9348
0	GU	NONE	077A	160	1.92	6.00	1.45	5	1-21-64	4-20-66	6032
0	GO	NONE	112A	160	4.80	6.00	1.45	5	1-16-64	2-15-65	5213
5	GU	AE	012C	NONE	5.00	6.00	NONE	5	3- 9-67	1-25-68	4934
0	GU	AE	058B	NONE	5.00	6.00	NONE	5	4- 8-67	1-25-68	4081
0	GO	NONE	084A	115	3.45	6.00	1.55	5	1-16-64	2-13-68	22448
0	GU	NONE	101A	115	3.45	6.00	1.55	5	1-16-64	9-20-64	3631
5	GE	NONE	093A	115	0.52	6.00	1.45	5	3-28-64	4-28-65	349
5	GE	NONE	097A	125	2.40	9.60	1.49	5	1- 4-64	11- 8-65	5002
0	GE	NONE	100A	160	1.92	6.00	1.45	5	1- 4-64	9-24-65	4424
0	GU	AE	047B	NONE	6.00	6.00	NONE	5	1- 5-67	6-15-68	6537
5	GU	AE	011B	NONE	6.00	9.60	NONE	5	10-17-66	1- 3-69	11933
0	GE	NONE	086A	160	1.15	3.60	1.45	5	12-29-67	1- 4-64	10661

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED
NICD	12.00	1.5	40	40	GE	AE	034A	NONE	6.00	9.60	NONE	5	1-27-67
NICD	12.00	1.5	40	25	GE	AE	024A	NONE	9.60	9.60	NONE	5	10- 2-65
NICD	12.00	1.5	40	25	GE	AE	024B	NONE	6.00	9.60	NONE	5	1- 5-67
NICD	12.00	1.5	40	25	GE	NONE	096A	125	6.00	9.60	1.49	5	1- 4-64
NICD	12.00	1.5	40	25	GU	NONE	096B	125	6.00	9.60	1.49	5	12- 2-64
NICD	12.00	3.0	25	25	GE	NONE	083A	125	1.50	6.00	1.49	5	1- 4-64
NICD	12.00	1.5	40	00	GE	AE	072A	NONE	6.00	6.00	NONE	5	1-20-67
NICD	12.00	1.5	25	40	GE	AE	036A	NONE	6.00	6.00	NONE	5	1-27-67
NICC	12.00	1.5	25	40	GE	NONE	099A	160	4.80	6.00	1.45	5	1- 9-64
NICD	12.00	1.5	25	40	GU	NONE	090B	160	8.00	10.00	1.45	5	12- 5-64
NICD	12.00	1.5	25	25	GE	AE	012A	NONE	6.00	6.00	NONE	5	7-20-65
NICD	12.00	1.5	25	25	GE	AE	012B	NONE	6.00	6.00	NONE	5	1- 6-67
NICD	12.00	1.5	25	25	GU	NONE	027B	125	3.75	6.00	1.49	5	1-28-65
NICD	12.00	1.5	25	25	GE	NONE	082A	125	3.75	6.00	1.49	5	1- 4-64
NICD	12.00	1.5	25	00	GE	AE	048A	NONE	9.60	9.60	NONE	5	10-12-65
NICD	12.00	1.5	25	00	GE	AE	058A	NONE	6.00	6.00	NONE	5	1-20-67
NICD	12.00	1.5	25	00	GE	AE	060A	NONE	6.00	6.00	NONE	5	10- 6-65
NICD	12.00	1.5	15	40	GE	NONE	085A	160	2.88	3.60	1.45	5	1- 2-64
NICD	12.00	1.5	15	40	GU	NONE	078A	160	2.88	3.60	1.45	5	12-22-64
NICD	10.00	1.5	25	40	GU	AE	006B	NONE	5.00	5.00	NONE	5	11-27-67
NICD	10.00	1.5	25	25	GU	AE	008B	NONE	5.00	5.00	NONE	5	11-27-67
NICD	6.00	1.5	40	*	GU	AE	048B	NA	4.80	4.80	NONE	5	4-25-67
NICD	6.00	24.0	50	25	GU	NONE	079A	115	0.20	3.00	1.49	5	3-28-64
NICD	6.00	3.0	40	25	GU	NONE	018A	125	1.20	4.80	1.49	10	12-31-63
NICD	6.00	1.5	25	40	GE	PLSEP	027C	NON	4.80	4.80	NONE	5	11- 7-68
NICD	6.00	1.5	25	40	GE	ROSEP	009G	NCNE	4.80	4.80	NONE	5	11- 7-68

FOLDOUT FRAME

FOLDOUT FR

INFORMATION ON COMPLETED TESTS

TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
40	GE	AE	034A	NONE	6.00	9.60	NONE	5	1-27-67	2- 3-67	65
25	GE	AE	024A	NONE	9.60	9.60	NONE	5	10- 2-65	11-19-65	665
25	GE	AE	024B	NONE	6.00	9.60	NONE	5	1- 5-67	2-10-67	38
25	GE	NONE	096A	125	6.00	9.60	1.49	5	1- 4-64	10- 2-64	4020
25	GU	NONE	096B	125	6.00	9.60	1.49	5	12- 2-64	11- 9-65	5152
25	GE	NONE	083A	125	1.50	6.00	1.49	5	1- 4-64	1-29-69	13897
00	GE	AE	072A	NONE	6.00	6.00	NONE	5	1-20-67	2- 2-67	304
40	GE	AE	036A	NONE	6.00	6.00	NONE	5	1-27-67	2- 3-67	75
40	GE	NONE	099A	160	4.80	6.00	1.45	5	1- 9-64	1- 5-65	4853
40	GU	NONE	090B	160	8.00	10.00	1.45	5	12- 5-64	11-10-65	5124
25	GE	AE	012A	NONE	6.00	6.00	NONE	5	7-20-65	12- 1-65	1698
25	GE	AE	012B	NONE	6.00	6.00	NONE	5	1- 6-67	2-10-67	404
25	GU	NONE	027B	125	3.75	6.00	1.49	5	1-28-65	9- 5-67	14250
25	GE	NONE	082A	125	3.75	6.00	1.49	5	1- 4-64	12-30-65	10878
00	GE	AE	048A	NONE	9.60	9.60	NONE	5	10-12-65	2-10-67	5110
00	GE	AE	058A	NONE	6.00	6.00	NONE	5	1-20-67	2-10-67	136
00	GE	AE	060A	NONE	6.00	6.00	NONE	5	10- 6-65	10-20-66	5650
40	GE	NONE	085A	160	2.88	3.60	1.45	5	1- 9-64	11- 8-65	9710
40	GU	NONE	078A	160	2.88	3.60	1.45	5	12-22-64	1- 4-66	11081
40	GU	AE	006B	NONE	5.00	5.00	NONE	5	11-27-67	3-14-68	5685
25	GU	AE	008B	NONE	5.00	5.00	NONE	5	11-27-67	5- 6-68	2414
*	GU	AE	048B	NA	4.80	4.80	NONE	5	4-25-67	7- 9-68	6156
25	GU	NONE	079A	115	0.20	3.00	1.49	5	3-28-64	10-13-65	545
25	GU	NONE	018A	125	1.20	4.80	1.49	10	12-31-63	8-18-64	1550
40	GE	PLSEP	027C	NON	4.80	4.80	NONE	5	11- 7-68	12-16-68	559
40	GE	RDSEP	009G	NONE	4.80	4.80	NONE	5	11- 7-68	11-21-68	143

FOLDOUT FRAME

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	START
NICD	6.00	3.0	25	40	GU	NONE	042A	160	1.20	3.00	1.45	10	12-31-
NICD	6.00	3.0	25	25	GU	NONE	017A	125	0.75	3.00	1.49	10	12-20-
NICD	6.00	1.5	25	00	GU	AE	059A	NONE	3.00	3.00	NONE	5	4-15-
NICD	6.00	3.0	25	00	GU	NONE	066A	115	0.69	3.00	1.55	10	12-31-
NICD	6.00	1.5	15	40	GE	AE	047C		1.80	1.80		5	7-18-
NICD	6.00	3.0	15	40	GU	NONE	041A	160	0.58	1.80	1.45	10	12-31-
NICD	6.00	3.0	15	00	GU	NONE	065A	115	0.41	1.80	1.55	10	12-31-
NICD	6.00	1.5	40	25	GU	IM	018B	125	3.00	4.80	1.49	5	2-22-
NICD	6.00	1.5	40	25	GU	AE	011A	NONE	4.80	4.80	NONE	5	2- 5-
NICD	6.00	1.5	40	00	GU	AE	071A	NONE	4.80	4.80	NONE	5	4-15-
NICD	6.00	1.5	25	40	GU	NONE	038A	160	2.40	3.00	1.45	10	12-30-
NICD	6.00	1.5	25	40	GU	IM	038B	160	2.40	3.00	1.45	5	2-22-
NICD	6.00	1.5	25	40	GU	AE	047A	NONE	3.00	3.00	NONE	5	5-16-
NICD	6.00	1.5	25	40	GU G	CLM	038C	NONE	3.00	3.00	1.45	5	5- 7-
NICD	6.00	1.5	25	25	GU	NONE	013A	125	1.88	3.00	1.49	10	12-31-
NICD	6.00	1.5	25	25	GU	NONE	014A	125	3.00	4.80	1.49	10	12-30-
NICD	6.00	1.5	25	00	GU	NONE	062A	115	1.72	3.00	1.55	10	12-30-
NICD	6.00	1.5	15	40	GU	AE	035A	NONE	1.80	1.80	1.45	5	6-28-
NICD	6.00	1.5	15	40	GU	NONE	037A	160	0.14	1.80	1.45	10	12-31-
NICD	6.00	1.5	15	00	GU	NONE	061A	115	1.04	1.80	1.55	10	12-31-
NICD	5.60	1.5	25	40	GU	RS	030B	160	2.24	2.80	1.45	5	12- 3-
NICD	5.60	1.5	25	40	GU	FRS	042B	160	2.24	2.80	1.45	5	12- 3-
NICD	5.60	1.5	25	25	GU	RS	096C	125	1.75	2.80	1.49	5	12-10-
NICD	5.00	3.0	40	25	SO	NONE	006A	125	1.00	4.00	1.49	10	1- 2-
NICD	5.00	3.0	25	40	SO	NONE	030A	160	0.80	2.50	1.45	10	12-31-
NICD	5.00	3.0	25	25	SO	NONE	005A	125	0.62	2.50	1.49	10	12-31-

INFORMATION ON COMPLETED TESTS

TH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
5	40	GU	NONE	042A	160	1.20	3.00	1.45	10	12-31-63	8-23-65	4133
5	25	GU	NONE	017A	125	0.75	3.00	1.49	10	12-20-63	1-31-65	2885
5	00	GU	AE	059A	NONE	3.00	3.00	NONE	5	4-15-67	2-28-68	14863
5	00	GU	NONE	066A	115	0.69	3.00	1.55	10	12-31-63	8-31-65	4414
5	40	GE	AE	047C		1.80	1.80		5	7-18-68	7-28-69	5842
5	40	GU	NONE	041A	160	0.58	1.80	1.45	10	12-31-63	9-14-64	1689
5	00	GU	NONE	065A	115	0.41	1.80	1.55	10	12-31-63	2-15-68	11208
0	25	GU	IM	0188	125	3.00	4.80	1.49	5	2-22-65	7-21-66	7577
0	25	GU	AE	011A	NONE	4.80	4.80	NONE	5	2- 5-65	7- 9-66	7743
0	00	GU	AE	071A	NONE	4.80	4.80	NONE	5	4-15-65	5-18-66	5754
5	40	GU	NONE	038A	160	2.40	3.00	1.45	10	12-30-63	5-22-64	1377
5	40	GU	IM	038B	160	2.40	3.00	1.45	5	2-22-65	3-31-66	5766
5	40	GU	AE	047A	NONE	3.00	3.00	NONE	5	5-16-67	5-11-66	5521
5	40	GU G	CLM	038C	NONE	3.00	3.00	1.45	5	5- 7-66	9-20-66	4059
5	25	GU	NONE	013A	125	1.88	3.00	1.49	10	12-31-63	11-11-64	4021
5	25	GU	NONE	014A	125	3.00	4.80	1.49	10	12-30-63	6-19-64	2086
5	00	GU	NONE	062A	115	1.72	3.00	1.55	10	12-30-63	2-15-68	22779
5	40	GU	AE	035A	NONE	1.80	1.80	1.45	5	6-28-65	11-30-67	12511
5	40	GU	NONE	037A	160	0.14	1.80	1.45	10	12-31-63	4-14-65	6064
5	00	GU	NONE	061A	115	1.04	1.80	1.55	10	12-31-63	12-17-65	10146
5	40	GU	RS	030B	160	2.24	2.80	1.45	5	12- 3-65	3- 8-66	1275
5	40	GU	FRS	042B	160	2.24	2.80	1.45	5	12- 3-65	9-10-66	3798
5	25	GU	RS	096C	125	1.75	2.80	1.49	5	12-10-65	9-19-67	9791
0	25	SO	NONE	006A	125	1.00	4.00	1.49	10	1- 2-64	12-13-65	5211
5	40	SO	NONE	030A	160	0.80	2.50	1.45	10	12-31-63	8- 7-65	4141
5	25	SO	NONE	005A	125	0.62	2.50	1.49	10	12-31-63	2-12-68	11092

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	START
------	-------	-------	-------	------	-------	-------	------	-------	-------	-------	-------	-------	-------

NICD	5.00	1.5	25	25	SO	AE	014D	NONE	2.50	1.47	1.50	5	17 37-6
NICD	5.00	3.0	25	00	SO	NONE	054A	115	0.58	2.50	1.55	10	12-31-6
NICD	5.00	3.0	15	40	SO	NONE	029A	160	0.48	1.50	1.45	10	12-31-6
NICD	5.00	3.0	15	00	SO	NONE	053A	115	0.35	1.50	1.55	10	12-31-6
NICD	5.00	1.5	40	25	SO	NONE	002A	125	2.50	4.00	1.49	10	12-17-6
NICD	5.00	1.5	40	25	SO	ST	087B	NONE	5.00	4.00	NONE	5	8-12-6
NICD	5.00	1.5	40	-20	SO	ST	089B	NONE	5.00	4.00	NONE	5	10-24-6
NICD	5.00	1.5	40	00	SO	ST	122B	NONE	5.00	4.00	NONE	5	9- 5-6
NICD	5.00	1.5	25	40	GE	NBPT	114A	130	1.63	2.50	1.49	5	6-12-6
NICD	5.00	1.5	25	40	GU	NBPT	128A	130	1.63	2.50	1.49	5	6-12-6
NICD	5.00	1.5	25	40	SO	NONE	026A	160	2.00	2.50	1.45	10	12-17-6
NICD	5.00	1.5	25	40	SO	ST	099B	NONE	5.00	2.50	NONE	5	8-23-6
NICD	5.00	1.5	25	25	SO	NONE	001A	125	1.56	2.50	1.49	10	12-17-6
NICD	5.00	1.5	25	25	GE	NBPT	104B	120	1.50	2.50	1.49	5	6-10-6
NICD	5.00	1.5	25	25	GU	NBPT	118B	120	1.50	2.50	1.49	5	6-10-6
NICD	5.00	1.5	25	25	SO	ST	073B	NONE	5.00	2.50	NONE	5	8-12-6
NICD	5.00	1.5	25	-20	SO	ST	075C	NONE	5.00	2.50	NONE	5	10-24-6
NICD	5.00	1.5	25	00	SO	NONE	050A	115	1.44	2.50	1.55	10	12-17-6
NICD	5.00	1.5	25	00	SO	ST	092A	NONE	5.00	2.50	NONE	5	9- 5-6
NICD	5.00	1.5	25	00	GU	NBPT	121A	110	1.38	2.50	1.49	5	6- 5-6
NICD	5.00	1.5	15	40	GE	NB	113A	130	0.98	1.50	1.45	5	4-24-6
NICD	5.00	1.5	15	40	GU	NB	127A	130	0.98	1.50	1.45	5	4-29-6
NICD	5.00	1.5	15	40	SO	NONE	025A	160	1.20	1.50	1.45	10	12-17-6
NICD	5.00	1.5	15	40	SO	ST	112B	NONE	5.00	1.50	NONE	5	8-23-6
NICD	5.00	1.5	15	00	SO	NONE	049A	115	0.86	1.50	1.55	10	12-31-6
NICD	4.00	1.5	15	40	GU	CC	028B	160	0.96	1.20	1.45	5	8- 4-6

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

P	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NOMCP	STARTED	COMPLETED	CYCLES
SO	AE	014D	NONE		2.50	1.47	1.50	5	11-37-67	2- 4-68	1179
SO	NONE	054A	115		0.58	2.50	1.55	10	12-31-63	2- 7-68	11331
SO	NONE	029A	160		0.48	1.50	1.45	10	12-31-63	4-17-66	5975
SO	NONE	053A	115		0.35	1.50	1.55	10	12-31-63	2-13-68	11427
SO	NONE	002A	125		2.50	4.00	1.49	10	12-17-63	4-24-65	6671
SO	ST	087B	NONE		5.00	4.00	NONE	5	8-12-65	1-27-66	2392
SO	ST	089B	NONE		5.00	4.00	NONE	5	10-24-65	2-26-66	1530
SO	ST	122B	NONE		5.00	4.00	NONE	5	9- 5-65	9-24-66	5190
GE	NBPT	114A	130		1.63	2.50	1.49	5	6-12-65	12-19-66	8273
GU	NBPT	128A	130		1.63	2.50	1.49	5	6-12-65	8-18-66	6345
SO	NONE	026A	160		2.00	2.50	1.45	10	12-17-63	10-15-64	3625
SO	ST	099B	NONE		5.00	2.50	NONE	5	8-23-65	7- 9-66	4388
SO	NONE	001A	125		1.56	2.50	1.49	10	12-17-63	2-27-66	11745
GE	NBPT	104B	120		1.50	2.50	1.49	5	6-10-65	11-15-67	13149
GU	NBPT	118B	120		1.50	2.50	1.49	5	6-10-65	11-22-66	8108
SO	ST	073B	NONE		5.00	2.50	NONE	5	8-12-65	4-15-66	3742
SO	ST	075C	NONE		5.00	2.50	NONE	5	10-24-65	4- 5-66	2145
SO	NONE	050A	115		1.44	2.50	1.55	10	12-17-63	2-15-68	22525
SO	ST	092A	NONE		5.00	2.50	NONE	5	9- 5-65	5-24-67	8774
GU	NBPT	121A	110		1.38	2.50	1.49	5	6- 5-65	3- 5-69	20861
GE	NB	113A	130		0.98	1.50	1.45	5	4-24-65	3-15-66	4998
GU	NB	127A	130		0.98	1.50	1.45	5	4-29-65	5-24-67	10638
SO	NONE	025A	160		1.20	1.50	1.45	10	12-17-63	10-31-65	9328
SO	ST	112B	NONE		5.00	1.50	NONE	5	8-23-65	4- 1-66	3294
SO	NONE	049A	115		0.86	1.50	1.55	10	12-31-63	2-15-68	23112
GU	CC	028B	160		0.96	1.20	1.45	5	8- 4-64	7- 6-68	20227

FOLDOUT FRAME

TYPE AMPHR PEROD DEPTH TEMP MANFR SPSYM PACK PRCHG CHGCU DISCU VOLIM NUMCP START

NICD	4.00	1.5	25	00	GU	CLM	052B	NONE	2.00	2.00	1.48	5	3- 3-
NICD	4.00	1.5	60	25	GU	CLM	038D	NONE	3.20	3.20	1.44	5	2-18-
NICD	4.00	1.5	40	25	GU	CC	014B	125	2.00	3.20	1.49	5	8- 4-
NICD	4.00	1.5	40	25	GU	CLM	037C	NONE	4.80	4.80	1.44	5	3- 4-
NICD	4.00	1.5	25	40	GU	CLM	039C	NONE	2.00	2.00	1.38	5	3- 3-
NICD	4.00	1.5	25	40	GU	CC	040B	160	1.60	2.00	1.45	5	8- 4-
NICD	4.00	1.5	25	25	GU	CLM	014C	NONE	2.00	2.00	1.44	5	3- 3-
NICD	4.00	1.5	15	25	GU	CLM	026C	NONE	1.20	1.20	1.44	5	2-18-
NICD	4.00	1.5	25	-20	GU	CLM	040C	NONE	2.00	2.00	1.56	5	3- 4-
NICD	3.90	1.5	25	25	NIFE	NONE	085C	107	1.07	2.00	1.50	5	9-29-
NICD	3.60	1.5	40	25	GU	CLM	039B	NONE	3.60	2.88	1.49	10	11-11-
NICD	3.50	3.0	40	25	GO	NONE	008A	125	0.75	2.80	1.49	10	12-20-
NICD	3.50	3.0	25	40	GO	NONE	032A	160	0.56	1.75	1.45	10	12-20-
NICD	3.50	1.5	40	25	GU	PS	073C	125	1.75	2.80	1.49	5	12-23-
NICD	3.50	1.5	25	40	GU	PS	112C	160	1.40	1.75	1.45	5	1- 2-
NICD	3.50	3.0	25	25	GO	NONE	007A	125	0.44	1.75	1.49	10	12-20-
NICD	3.50	3.0	25	00	GO	NONE	056A	115	0.40	1.75	1.55	10	12-20-
NICD	3.50	3.0	15	40	GO	NONE	031A	160	0.34	1.05	1.45	10	12-20-
NICD	3.50	3.0	15	00	GO	NONE	055A	115	0.24	1.05	1.55	10	12-20-
NICD	3.50	1.5	25	00	GO	NONE	052A	115	1.00	1.75	1.55	10	12- 5-
NICD	3.50	1.5	40	25	GO	NONE	004A	125	1.72	2.80	1.49	10	12- 5-
NICD	3.50	1.5	25	40	GO	NONE	028A	160	1.40	1.75	1.45	10	12-12-
NICD	3.50	1.5	25	25	GO	NONE	003A	125	1.09	1.75	1.49	10	12- 6-
NICD	3.50	1.5	15	40	GO	NONE	027A	160	0.84	1.05	1.45	10	12-12-
NICD	3.50	1.5	15	00	GO	NONE	051A	115	0.60	1.05	1.55	10	12- 5-
NICD	3.00	3.0	40	25	GE	NONE	020A	125	0.60	2.40	1.49	10	12-20-

FOLDOUT FRAME

FOLDOUT FRAME

TH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
5	00	GU	CLM	052B	NONE	2.00	2.00	1.48	5	3- 3-67	3- 4-68	5671
0	25	GU	CLM	038D	NONE	3.20	3.20	1.44	5	2-18-67	6-27-67	1927
0	25	GU	CC	014B	125	2.00	3.20	1.49	5	8- 4-64	3-19-66	8474
0	25	GU	CLM	037C	NONE	4.80	4.80	1.44	5	3- 4-67	5- 5-67	790
5	40	GU	CLM	039C	NONE	2.00	2.00	1.38	5	3- 3-67	6-20-67	1508
5	40	GU	CC	040B	160	1.60	2.00	1.45	5	8- 4-64	6-22-66	10360
5	25	GU	CLM	014C	NONE	2.00	2.00	1.44	5	3- 3-67	8- 8-67	2428
5	25	GU	CLM	026C	NONE	1.20	1.20	1.44	5	2-18-67	2-28-69	11455
5	-20	GU	CLM	040C	NONE	2.00	2.00	1.56	5	3- 4-67	3- 4-67	2
5	25	NIFE	NONE	085C	107	1.07	2.00	1.50	5	9-29-67	6-18-69	9356
0	25	GU	CLM	039B	NONE	3.60	2.88	1.49	10	11-11-65	12- 6-66	5399
0	25	GO	NONE	008A	125	0.75	2.80	1.49	10	12-20-63	11-29-64	2494
5	40	GO	NONE	032A	160	0.56	1.75	1.45	10	12-20-63	6-10-64	975
0	25	GU	PS	073C	125	1.75	2.80	1.49	5	12-23-66	10-28-68	9978
5	40	GU	PS	112C	160	1.40	1.75	1.45	5	1- 2-67	1- 3-69	11155
5	25	GO	NONE	007A	125	0.44	1.75	1.49	10	12-20-63	7-26-65	4173
5	00	GO	NONE	056A	115	0.40	1.75	1.55	10	12-20-63	2-15-68	11897
5	40	GO	NONE	031A	160	0.34	1.05	1.45	10	12-20-63	1- 3-65	2517
5	00	GO	NONE	055A	115	0.24	1.05	1.55	10	12-20-63	2-15-68	11546
5	00	GO	NONE	052A	115	1.00	1.75	1.55	10	12- 5-63	6-11-66	13730
0	25	GO	NONE	004A	125	1.72	2.80	1.49	10	12- 5-63	7- 9-64	3164
5	40	GO	NONE	028A	160	1.40	1.75	1.45	10	12-12-63	5-29-64	1811
5	25	GO	NONE	003A	125	1.09	1.75	1.49	10	12- 6-63	10-31-64	4751
5	40	GO	NONE	027A	160	0.84	1.05	1.45	10	12-12-63	11- 4-64	4485
5	00	GO	NONE	051A	115	0.60	1.05	1.55	10	12- 5-63	2-15-68	22364
0	25	GE	NONE	020A	125	0.60	2.40	1.49	10	12-20-63	1- 8-66	5410

FOLDOUT FRAME

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STA
NICD	3.00	3.0	25	40	GE	NONE	044A	160	0.48	1.50	1.45	10	12-2
NICD	3.00	3.0	25	25	GE	NONE	019A	125	0.38	1.50	1.49	10	12-2
NICD	3.00	3.0	25	00	GE	NONE	068A	115	0.34	1.50	1.55	10	12-2
NICD	3.00	3.0	15	40	GE	NONE	043A	160	0.29	0.90	1.45	10	12-2
NICD	3.00	3.0	15	00	GE	NONE	067A	115	0.21	0.90	1.55	10	12-2
NICD	3.00	1.5	40	25	GE	NONE	016A	125	1.50	2.40	1.49	10	12-
NICD	3.00	1.5	40	25	SO	3S	002B	125	1.50	2.40	1.49	5	7-10
NICD	3.00	1.5	25	40	GE	NONE	040A	160	1.20	1.50	1.45	10	12-1
NICD	3.00	1.5	25	40	SO	3S	037B	160	1.20	1.50	1.45	5	7-10
NICD	5.60	1.5	25	25	GU	FRS	076B	125	1.75	2.80	1.49	5	12-10
NICD	6.00	1.5	25	25	GU	AE	023A	NONE	3.00	3.00	1.49	5	2-
NICD	3.00	1.5	25	25	GE	NONE	015A	125	0.94	1.50	1.49	10	12-
NICD	3.00	1.5	25	25	SO	3S	003B	125	0.94	1.50	1.49	5	6-25
NICD	3.00	1.5	25	00	GE	NONE	064A	115	0.86	1.50	1.55	10	12-
NICD	3.00	1.5	15	40	GE	NONE	039A	160	0.72	0.90	1.45	10	12-12
NICD	3.00	1.5	15	40	SO	3S	026B	160	0.72	0.90	1.45	5	7-10
NICD	3.00	1.5	15	00	GE	NONE	063A	115	0.52	0.90	1.55	10	12-
NICD	1.25	1.5	60	00	GU	NONE	098B	NONE	1.25	1.50	NONE	5	3-
PBCA	5.00	1.5	40	25	CD	NONE	009B	NONE	2.39	2.39	2.25	5	8-23

INFORMATION ON COMPLETED TESTS

TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
40	GE	NONE	044A	160	0.48	1.50	1.45	10	12-20-63	9-14-65	4487
25	GE	NONE	019A	125	0.38	1.50	1.49	10	12-20-63	2-12-68	10768
00	GE	NONE	068A	115	0.34	1.50	1.55	10	12-20-63	2-13-68	11740
40	GE	NONE	043A	160	0.29	0.90	1.45	10	12-20-63	12-26-64	2656
00	GE	NONE	067A	115	0.21	0.90	1.55	10	12-20-63	2-15-68	11532
25	GE	NONE	016A	125	1.50	2.40	1.49	10	12- 5-63	11-18-64	5014
25	SO	3S	002B	125	1.50	2.40	1.49	5	7-10-65	7-26-66	5399
40	GE	NONE	040A	160	1.20	1.50	1.45	10	12-12-63	7- 9-64	2511
40	SO	3S	037B	160	1.20	1.50	1.45	5	7-10-65	8- 4-66	5625
25	GU	FRS	076B	125	1.75	2.80	1.49	5	12-10-65	1- 2-68	11158
25	GU	AE	023A	NONE	3.00	3.00	1.49	5	2- 5-65	1-24-68	15713
25	GE	NONE	015A	125	0.94	1.50	1.49	10	12- 6-63	11- 6-65	10382
25	SO	3S	003B	125	0.94	1.50	1.49	5	6-25-65	8-23-67	11726
00	GE	NONE	064A	115	0.86	1.50	1.55	10	12- 5-63	2-14-68	23441
40	GE	NONE	039A	160	0.72	0.90	1.45	10	12-12-63	6-19-65	8109
40	SO	3S	026B	160	0.72	0.90	1.45	5	7-10-65	10- 4-66	6285
00	GE	NONE	063A	115	0.52	0.90	1.55	10	12- 6-63	2-15-68	22923
00	GU	NONE	098B	NONE	1.25	1.50	NONE	5	3- 4-66	5-28-68	12247
25	CO	NONE	009B	NONE	2.39	2.39	2.25	5	8-23-65	9-21-65	39

FOLDOUT FRAME

FOOTNOTE

- * THESE CELLS ARE IN AMBIENT TEMPERATURE, WHICH VARIES SINUSOIDALLY FROM ZERO TO FORTY DEGREES CENTIGRADE WITHIN A PERIOD OF 48 HOURS.
- * PACKS 15B AND 61B HAVE RECEIVED 22,900 CYCLES AT 10 PERCENT DEPTH OF DISCHARGE, AND AT -10 DEGREES CENTIGRADE BEFORE CYCLE ONE WAS STARTED AT N.A.D. CRANE

MULTI THESE PACKS CONTAIN TWO CELLS WITH THIRD ELECTRODES, A COULOMETER PRESSURE TRANSDUCERS, AND PRESSURE GAGES

FOLDOUT FRAME

FOLDOUT FRAME

DATA AVAILABLE

1. The lists of data available, with the approval of Goddard Space Flight Center, are listed below. This information is stored on magnetic tape files at NAD Crane and must be obtained through the use of computer programs. Since the computer programs are time consuming a time lapse of several weeks between the request and the receipt of the data can be expected.

- a. Additional copies of this report.
- b. Serial numbers of cells in the various packs.
- c. Capacity check information; parameters and results.
- d. Cell failure analysis.
- e. Data recorded from packs during automatic cycling.
- f. Determination of number of cells in pack, middle and end of discharge voltages, end of charge voltage and percent recharge. This is all calculated from the data in paragraph 1.e. above.